

Database helps engineers compare designs

by Melissa Withrow, Air Vehicles Directorate

WRIGHT-PATTERSON AIR FORCE BASE, Ohio — The Air Force Research Laboratory's Air Vehicles Directorate worked with UNISTRY, Inc. to develop a new engineering technique that predicts the loads place on an aircraft during flight by fluctuations in high frequency sound pressure.

As part of a Small Business Innovation Research program, the technique takes data from a variety of sources and compiles it onto one curve. Data displayed in this way is easier for engineers to compare and use to make design performance predictions.

Using the technique, the directorate generated a database demonstrating how sound pressure varies with changes in frequency for various structural configurations, types of airflow, and data processing methods. The database is particularly valuable for its data on weapons bays and noise generated on pulse detonated engines. The directorate also developed a commercialization plan to place the database on an internet accessible CD-ROM.

During flight, an aircraft is subjected to strong pressure fluctuations caused by airflow and acoustic resonance. The resulting acoustic loads have high sound pressure levels at high frequencies that can damage weapons, crack nearby surfaces and components, and radiate intense noise. With Air Vehicles' new database, engineers can assess the effects of this phenomenon and use the knowledge to design aircraft with increased structural life, lower maintenance costs, and increased readiness. @